

**REMARKS/ARGUMENTS**

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1, 2, 5, 10, 11-13, 16, 21, 23-24, 29, 41, 42, 48, and 55-56 are presently active. Claims 7-8, 18-19, 22, 30-34, 36-37, 38-40, 4 and 6 have been previously canceled without prejudice or disclaimer. Claims 3, 4, 6, 9, 12, 14, 15, 17, 20, 25-28, 35, 38-40, 43-45, 47, and 49-54 have been presently canceled without prejudice or disclaimer. Claims 1, 2, 5, 10, 13, 16, 21, 29, 41, 42, 48, 55, and 56 having been presently amended, No new matter has been added.

In the outstanding Office Action, Claims 1, 3, 4, 13, 14, 24, 47, and 48 were rejected under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Itano (U.S. 2003/0127118). Claims 29, 52, 53, and 56 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Itano. Claims 2, 11, and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Itano, and further in view of Applicant's background art description. Claims 9, 10, 20, 21, 23, 54, and 55 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Itano and further in view of Jain et al (U.S. 6,613,682). Claims 5, 6, 12, 16, 17, and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Itano and further in view of Sato et al (U.S. 5,861,601). Claims 35 and 38-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Itano and further in view of Suzuki et al (U.S. 2002/0155714). Claims 47 and 48 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 47-56 were objected to because of the following informalities: Claim 46 was indicated as canceled; however, there is no original Claim 46.

Regarding the 35 U.S.C. § 112, second paragraph, rejection, Claim 47 was canceled, thereby addressing the issue raised in the Office Action. Thus, the 35 U.S.C. § 112, second paragraph, rejection has been overcome.

Regarding the Examiner's note regarding the absence of Claim 46, Claim 46 was added by way of the Article 19 amendment forwarded to the U.S. Patent and Trademark Office and appearing in the image file history under the heading "Documents submitted with 371 Applications." Thus, Applicants have not presently renumbered the claims, as suggested by the Examiner.

**Amendment Synopsis:** Claim 1 as clarified combines pending Claim 1 with the claim element of pending Claim 9 along with additional clarifications. As regards the additional clarifications, "exhausting the process chamber" is supported in paragraph [0058] of the specification, for example. The expression "cleaning gas consisting of ---" is supported in paragraph [0060] of the specification, for example.

Amended Claim 2 combines pending Claims 2 and 3.

Amended Claim 5 combines pending Claims 4, 5, and 6.

Amended Claim 10 merely includes amendments made in accordance with the amendments to Claim 1.

Amended Claim 13 combines pending Claim 13 with the claim elements of pending Claims 14, 15, and 20 along with additional clarifications as in amended Claim 1. In this claim, the gate electrode in pending Claim 15 has been expressed as a laminated film.

Amended Claim 16 combines pending Claims 16 and 17.

Amended Claim 21 merely includes amendments made in accordance with the amendments to Claim 13.

Amended Claim 29 changes pending Claim 29 such that steps for a plasma oxidation process that corresponds to the claim element of pending Claim 35 are performed before and after the cleaning step, along with additional clarifications as in amended Claim 1.

Amended Claims 41 and 42 merely include amendments made in accordance with the dependence on amended Claim 29.

Amended Claim 48 has been drafted to recite a sequence of the steps as in amended Claim 29 along with the cleaning gas type recited in pending Claim 48.

Amended Claims 55 and 56 merely include amendments made in accordance with the dependence on amended Claim 29.

Thus, no new matter has been added.

**Claim Attributes:** Independent Claims 1, 13, and 29 as clarified include the claim elements of “exhausting the process chamber while supplying a cleaning gas consisting of O<sub>2</sub> gas and H<sub>2</sub> gas and an inactive gas or consisting of O<sub>2</sub> gas and H<sub>2</sub> gas into the process chamber with a ratio of the H<sub>2</sub> gas relative to the O<sub>2</sub> gas set at 2 or more, and generating plasma, of the cleaning gas, thereby performing cleaning inside the process chamber.” With these claim elements, it is possible to efficiently clean a process chamber contaminated with metal, such as tungsten, in a substrate processing apparatus.

In these claims, the gases composing the cleaning gas are specified by use of the expression “consisting of.” Of these gases, O<sub>2</sub> gas plasma basically serves to sublime metal oxide, such as WO<sub>x</sub>, deposited inside the process chamber (sublimated substances are exhausted along with exhaust flows). H<sub>2</sub> gas plasma serves to deoxidize metal oxide, such as WO<sub>x</sub>, into a more unstable state, such as ions, thereby facilitating sublimation of the metal

oxide. The Examiner will appreciate that an inactive gas such as for example Ar gas can serve to increase the plasma density.

Independent Claim 48 as clarified includes the claim elements of “exhausting the process chamber without the first substrate placed therein while supplying a cleaning gas consisting of O<sub>2</sub> gas or consisting of O<sub>2</sub> gas and an inactive gas into the process chamber, and generating plasma of the cleaning gas, thereby performing cleaning inside the process chamber.” As described above, the cleaning gas may include H<sub>2</sub> gas, but the Examiner will appreciate that the cleaning gas can provide certain effects without H<sub>2</sub> gas being present.

**Art Deficiencies:** Itano describes a chamber cleaning gas containing a gas selected from the group consisting of CF<sub>3</sub>CF=CF<sub>2</sub>, CF<sub>3</sub>CF(O)CF<sub>2</sub>, and CF<sub>3</sub>C(CF<sub>3</sub>)O. Further, Itano describes that the chamber cleaning gas may contain a gas selected from the group consisting of He, Ne, Ar, H<sub>2</sub>, N<sub>2</sub>, and O<sub>2</sub>.

Jain et al describe etching of DARC (dielectric antireflective coating) / Poly-silicon on a substrate by use of CF<sub>4</sub>/HBr/Cl<sub>2</sub>/He/O<sub>2</sub>, and etching of DARC / Tungsten silicide on a substrate by use of NF<sub>2</sub>/Cl<sub>2</sub>/He/O<sub>2</sub>.

Sato et al describe a method for etching an aluminum alloy (Al-Si-Cu) on a substrate by use of BCl<sub>3</sub>/Cl<sub>2</sub>/CH<sub>2</sub>F<sub>2</sub>, and then cleaning the empty chamber by use of plasma of O<sub>2</sub> or O<sub>2</sub> + SF<sub>6</sub> gas.

However, none of these references discloses or suggests a method for performing cleaning inside a process chamber by use of the presently claimed cleaning gas 1) consisting of O<sub>2</sub> gas and H<sub>2</sub> gas and an inactive gas or 2) consisting of O<sub>2</sub> gas and H<sub>2</sub> gas, as defined in independent Claims 1, 13, and 29.

Further, none of these references disclose or suggest a method for performing cleaning inside a process chamber by use of the specific cleaning gas, defined in independent

Claim 48, after performing a plasma oxidation process on a substrate including a tungsten-containing film to selectively oxidize a poly-silicon film. In other words, none of these references disclose or suggest the relationship between tungsten and the specific cleaning gas set forth in Claim 48.

Suzuki is cited as a reference concerning end point detection. This reference describes etching of various layers on a substrate, but the etching gases used differs from those claimed. Further, Suzuki describes nothing about a cleaning technique inside a process chamber.

M.P.E.P. § 2131 requires for anticipation that each and every feature of the claimed invention must be shown in as complete detail as is contained in the claim. M.P.E.P. § 2143.03 requires that all words in a claim must be considered in judging the patentability of the claim against the prior art. Furthermore, M.P.E.P. § 2123 I states that a reference may be relied on for all it would have *reasonably suggested* to one having ordinary skill in the art, including non-preferred embodiments.

Accordingly, with these deficiencies in the art, there is no showing of the features noted above w in as complete detail as is contained in the claim and there is no reasonable suggestion of these features in the applied art.

Hence, independent Claims 1, 13, 29, and 48 (and the claims dependent therefrom) should be passed to allowance.

**Conclusion:** In view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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